

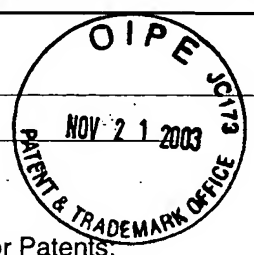
2357-3

DIVISION/CONTINUATION APPLICATION TRANSMITTAL FORM

ATTORNEY'S DOCKET NO.
28230-3

112103

17608 U.S. PTO



PRIOR APPLICATION:

EXAMINER

H. Noori

ART UNIT

2357

17497 U.S. PTO
10/725724

112103

Express Mail® mailing label number _____

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to the Assistant Commissioner for Patents:

Transmitted herewith for filing is a ☒ continuation ☐ divisional application under 37 CFR 1.53 (b), of pending prior application

Serial No. 09/760,150

filed on January 16, 2001

Joseph J. Shiang and Anil R. Duggal

(Inventor)

For ORGANIC ELECTROLUMINESCENT DEVICE WITH A CERAMIC OUTPUT COUPLER AND METHOD
OF MAKING THE SAME

(Title of Invention)

ENCLOSED ARE:

1. ☒ Specification having 40 total pages.
2. ☒ 8 sheets of ☒ formal ☐ informal drawings.
3. ☒ Declaration ☒ copy from prior application.
☐ newly executed (if additional inventor(s) under 37 CFR 1.63(d) (5).
4. ☒ Preliminary Amendment.
5. ☐ Signed statement deleting inventor(s) named in prior application under 37 CFR 1.63 (d) (2).
6. ☐ The power of attorney or correspondence address was changed during prosecution of the prior application.
A copy of the new power of attorney or correspondence address is submitted herewith under 37 CFR 1.63 (d) (4).
7. ☒ Other Information Disclosure Statement and Form 1449

The filing fee is calculated below:

CLAIMS AS FILED IN THE PRIOR APPLICATION, LESS
ANY CLAIMS CANCELED BY AMENDMENT BELOW

	NUMBER FILED	NUMBER EXTRA	RATE	BASIC FEE
				\$770.00
TOTAL CLAIMS	22 - 20 =	2	X \$18.00	\$36.00
INDEPENDENT CLAIMS	2 - 3 =	0	X \$86.00	\$0.00
ADDITIONAL FEE FOR USE OF MULTIPLE DEPENDENT CLAIM(S) (once per application)			X \$290.00	
TOTAL FILING FEE				\$806.00

DIVISION/CONTINUATION APPLICATION TRANSMITTAL FORM

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28230-3

8. ☒ Please charge \$806.00 to my Deposit Account No. 07-0868.
9. ☒ The Assistant Commissioner is hereby authorized to charge all fees required under 37 CFR 1.16 or 1.17, or credit any overpayment to Deposit Account No. 07-0868.
10. ☐ Cancel in this application original claims _____ of the prior application before calculating the filing fee. (At least one original independent claim must be retained for filing purposes.)
11. ☒ Amend the specification by inserting before the first line the sentence: This application is a ☒ continuation ☐ division of application Serial No. 09/760,150, filed 01/16/01, which is hereby incorporated by reference in its entirety.
12. ☐ Priority of application Serial No. _____ filed on _____ in _____ is claimed under 35 U.S.C. 119.
(country)
- ☐ The certified copy has been filed in prior application Serial No. _____, filed _____.

SEND CORRESPONDENCE TO:

General Electric Company
CRD Patent Docket Rm 4A59
P.O. Box 8, Bldg. K1
Schenectady, New York 12301
Customer Number: 006147

November 13, 2003
(date)

Toan P. Vo
Signature Toan P. Vo
Reg. No. 43,225

- ☒ attorney or agent of record
☐ Filed under §1.34(a)

Three copies of this form are enclosed.

Serial No.



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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of

Joseph J. Shiang et al.

For: ORGANIC ELECTROLUMINESCENT DEVICE
WITH A CERAMIC OUTPUT COUPLER AND
METHOD OF MAKING THE SAME

Attorney Docket Number: RD-28230-3

MAILSTOP PATENT APPLICATION

Commissioner for Patents

P.O. BOX 1450

Alexandria, VA 22313-1450

TRANSMITTAL LETTER

Applicants submit herewith a continuation application, claiming the benefit of U.S. Application No. 09/760,150 filed January 16, 2001.

An Office Action dated July 28, 2003 was issued in the parent case, Application No. 09/760,150. Applicants respectfully submit the following remarks concerning that Office Action.

Claims 1-2, 6, 13-14, 16-17 and 37-39 of the parent application (corresponding to current Claims 1-2, 6, 7, 12-13, 15-16 and 20-22) were rejected under 35 U.S.C. §102(e) as being anticipated by Hung (U.S. Patent No. 6,208,077). The Office Action states that Hung discloses an organic electroluminescent light device with a first electrode, a second electrode, an organic light emitter layer, and a ceramic substrate that

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Adjustment date: 12/04/2003 ZJU HAR2
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01 FC:1202 36.00 CR

Serial No.

is made of ceramic materials, which naturally have a plurality of voids. Applicants respectfully traverse this rejection.

Hung is directed to organic electroluminescent (EL) devices. As stated in column 4, lines 1-2 of Hung, the substrate is either light transmissive or opaque. Continuing into column 4, Hung provides, at lines 2-10, that where the EL emission is viewed through the top electrode, the transmissive characteristic of the support is immaterial, and therefore any appropriate substrate such as opaque semiconductor and ceramic wafers can be used. Hung further states that in those device configurations, a light transparent top electrode is necessary.

The present invention is directed to an organic electroluminescent light emitting device, comprising a first electrode, a second electrode, at least one organic light emitting layer and a ceramic output coupler, which comprises a ceramic material and a plurality of voids distributed therein. As stated in the specification at page 4, lines 12-28, the Applicants have realized that, by using a ceramic output coupler, the OLED quantum efficiency may be improved compared to using glass or plastic substrate with a textured surface or lens array. A ceramic output coupler of the instant invention accomplishes this goal by providing a ceramic material having a plurality of voids distributed therein. According to the present invention, the transmissive characteristic of the support is not immaterial; hence the requirement for the ceramic output coupler to be comprised of a ceramic material having a plurality of voids.

Hung does not teach a ceramic output coupler comprised of a ceramic material and a plurality of voids distributed therein. Accordingly, Hung does not teach each and every element of current Claim 1. The Office Action argues that voids are natural characteristics of all ceramic materials. Applicants respectfully traverse the Examiner's statement. One of ordinary skill in the art readily understands that various ceramics may be made without any voids. One such ceramic material having no voids is made by resolidification of a ceramic melt.

With respect to current Claim 2, as stated above, Hung does not teach a ceramic output coupler comprising a ceramic material and a plurality of voids distributed therein wherein the ceramic output coupler comprises a ceramic layer containing a light emitting surface of the device. As taught in Hung, for applications where the EL

Serial No.

emission is viewed through the top electrode, the transmissive characteristic of the support is immaterial and ceramic wafers may be used but only with a light transparent top electrode. Accordingly, Hung does not teach or suggest a ceramic output coupler containing a light emitting surface of the device.

Regarding Claims 12 and 13, Hung does not teach or suggest a ceramic output coupler that randomly volume scatters light emitted by the organic layer to reduce a critical angle loss. Hung nowhere mentions critical angle loss.

Regarding Claims 15 and 16, in addition to the arguments above, Hung does not teach or suggest a ceramic output coupler comprising a light emitting material. The Office Action does not point to where Hung teaches or suggests the claimed invention.

Regarding Claims 20-22, Hung does not teach or suggest a method of making an OLED comprising forming a first electrode, forming at least one organic light emitting layer, forming a second electrode, and forming a ceramic output coupler, which comprises a plurality of voids formed within a volume of the ceramic output coupler. As stated above, Hung does not teach or suggest a ceramic output coupler with a plurality of voids formed within. Further, regarding Claim 21, Hung does not teach forming the first electrode over a first surface of glass or polymer substrate and forming a ceramic output coupler over the second surface of the glass or polymer substrate. Hung teaches that the substrate may be a ceramic wafer when the transmissive characteristic of the substrate material is immaterial. Hung does not teach, or even suggest the utilization of glass or polymer substrate and a ceramic output coupler.

Claims 3-5, 7-9, 15 and 18-20 of the parent application (corresponding to current Claims 3-5, 7-9, 14 and 17-19) were also rejected under 35 U.S.C. §103(a) as being unpatentable over Hung. The Office Action states that Hung is silent about the characteristics of the ceramic substrate, and states that it would have been obvious to one having ordinary skill in the art to modify the layers for matching proper indexes of refraction to fit the other layers in order to have meaningful working arrangements.

The Examiner is correct in that Hung is silent about the characteristics of the ceramic substrate. However, contrary to the statement in the Office Action, one of ordinary skill in the art would not have been motivated to modify the layers of Hung. As

Serial No.

mentioned above, Hung specifically provides that a ceramic substrate is only used when the transmissive characteristics of the substrate is immaterial. If the characteristics of the substrate were immaterial, one of ordinary skill in the art would not attempt to modify the layers for matching proper indexes of refraction to fit other layers. Accordingly, at the time the invention was made, it would not have been obvious to one of ordinary skill in the art to modify any layers of Hung, particularly the ceramic substrate.

Claims 10-11 (corresponding to current Claims 10-11) were rejected under 35 U.S.C. §103(a) as being unpatentable over Hung in view of Kitazume et al. The Office Action states that Hung does not teach a corrugated emitting surface and states that Kitazume is presented to show such an arrangement and that it would have been obvious for one of ordinary skill in the art to modify Hung to provide a corrugated surface for general emitting enhancement. Applicants traverse this rejection.

As described above, Hung only discloses a ceramic wafer substrate for use in an EL device if the transmissive characteristic of the support is immaterial and further provides that a light transparent top electrode is necessary. Hung does not suggest the use of ceramic output coupler comprising a plurality of voids.

Kitazume is directed to organic thin film electroluminescence panels, more specifically, to the structure of a metal electrode in an EL panel. The EL panels of Kitazume are glass (see column 2, lines 13-16). Kitazume further states that in the process of forming an EL panel, since the metal, having a lower resistivity, is continuously deposited, heat radiated from the vapor source increases the substrate temperature to be equal to the glass transition temperature or more of the organic film. Then, the organic film may agglomerate to form corrugations on its surface, or a pinhole may be formed in the film to short-circuit the transparent electrodes and the metal electrodes. (See column 2, line 62 to column 3, line 5). Kitazume states that this is a problem in the field that it is trying to overcome. Specifically, at column 7, lines 15-20, Kitazume provides that “damage to the organic film such as a formation of a pinhole due to agglomeration of the organic film can be prevented.” Accordingly, Kitazume is trying to prevent the agglomeration that causes corrugations to form.

Kitazume and Hung are improperly combined. First, Kitazume does not teach or even suggest a ceramic output coupler. Secondly, Kitazume discloses only a

Serial No.

transparent substrate. Thirdly, as discussed above, Kitazume teaches away from corrugations. Even if Kitazume and Hung were combined, one of ordinary skill in the art would not arrive at the Applicants' claimed invention of Claims 10 and 11 because Kitazume teaches away from the formation of corrugations.

Applicants respectfully submit that all claims as presented are allowable, and request prompt issuance of a Notice of Allowance. In order to expedite the issuance of the application, should the Examiner have any questions, he is encouraged to contact the undersigned at the telephone number below.

Respectfully submitted,

A handwritten signature in black ink, appearing to read "Toan P. Vo", written over a horizontal line.

Toan P. Vo, Ph.D

Attorney for Applicants

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November 13, 2003

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